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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/876,567	06/07/2001	William R. Dudley	55806USA1A.002	7795

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EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 11/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/876,567

Applicant(s)

DUDLEY ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-56 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1-56. All rejections except the §102 rejection of claims 1, 2, and 47 over Yamada have been withdrawn. New grounds of rejection are applied herein to claims 1-5 and 7-56. Claim 6 is objected to as containing allowable subject matter. Accordingly, this action is non-final.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 5, 7-9, 16-28, 34, 35, and 47-54 are rejected under 35 U.S.C. 102(e) as being anticipated by Carlson (U.S. Patent 6,488,721).

Regarding claim 52, the reference teaches a battery component (38, 39) comprising an anode (710), a separator (102), a cathode (201), an edge material (301) contacting an edge of the cathode, and a cathode current collector (401) (see Fig. 10, col. 32, line 15 et seq.). Regarding claims 1 and 25, a substrate (102) is coated with an edge material (301) and then a cathode

material (201), thereby "improving" the thickness profile of the cathode (see Fig. 6). Regarding claim 5, the edge material acts as a physical boundary. Regarding claim 25, the edge material may be non-viscoelastic (see col. 27, line 17). Regarding claim 47, the substrate (102) may also be coated with a cathode material (201) and then the edge material (301) such that the cathode material and edge material touch each other (see Fig. 5). Regarding claims 26, 47, 52 and 54, the edge material is capable of functioning as a barrier to moisture and light. Regarding claims 23 and 24, the cathode and edge layers may be solvent coated (see col. 27, line 10). Regarding claim 16, the cathode material edge is approximately square and has a uniform thickness profile and a width of less than 200 microns (see col. 18, line 2; Fig. 5). Regarding claims 17, 18, 21, 22, 34, 35, 48 and 49, the cathode and edge layers may be extrusion coated (see col. 27, line 15). Regarding claim 17, the cathode material layer may be calendered (see col. 17, line 57). Regarding claims 19, 27, and 53, the edge material may comprise an electrically insulating polymer such as an ethylene, propylene, or urethane (see col. 25, line 10). Regarding claims 50 and 51, the wet and dry coating thicknesses of the edge material are approximately equal to the wet and dry coating thickness of the cathode material (see Fig. 5; col. 25, line 1). Regarding claims 20 and 28, the cathode material comprises an electrode active material, an electrically conductive material, and an ionically conductive material (e.g., ionically conducting polymer, electrolyte salt) (see col. 17, line 60; col. 29, line 43 et seq.). Regarding claim 7, the cathode material and the edge material are "immiscible" because distinct layers are formed upon coating. Regarding claim 8, the shape of the cathode edge is inherently altered by the presence of the

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edge material. Regarding claim 9, the cathode thickness is in the range of 5 to 200 microns (e.g., 100 microns), which anticipates the ranges of bulk and edge cathode thicknesses.

Thus, the instant claims are anticipated.

4. Claims 36 and 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Liu et al (U.S. Patent 6,159,544). The reference teaches the steps of providing a substrate and coating edge material (A) and coating material (B) onto the substrate simultaneously using a slotted die coater, wherein the edge material and the coating material contact each other (see col. 5, line 59; the abstract; Fig. 1). The thickness profile of the coating material edge is thereby "improved" (see col. 2, lines 24-45).

Thus, the instant claims are anticipated.

5. Claims 1, 2, and 47 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada (U.S. Patent 5,404,025). Regarding claims 1 and 47, the reference teaches the steps of providing a substrate (2, 3) and coating a cathode layer (1, 6) onto the substrate (see Fig. 2; col. 4, line 63, et seq.). An insulating edge material (53) is then coated onto the substrate, wherein the cathode material and the edge material contact each other (see Fig. 6). Regarding claim 2, as shown in Figure 6, the cathode comprises a tapered edge. Regarding the preambular limitation that the

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cathode is "for an electrochemical cell," this is the intended use of the structure and is given little patentable weight. See MPEP §2111.02.

Thus, the instant claims are anticipated.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 52-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al (U.S. Patent 6,521,382) in view of Carlson.

Regarding claims 52 and 55, Song et al. teach a battery in Figure 3 comprising the following sequential layers: anode (1), first electrolyte (separator) (4), first cathode (6), cathode current collector (8), second cathode, and second separator.

The reference does not expressly teach that an edge material contacts the edge of the cathode, as recited in claim 52.

As set forth above, Carlson teaches a battery comprising a polymeric cathode edge material layer (301).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the

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disclosure of Carlson to use an edge material in the cathode of Song et al. In column 23, line 5, Carlson teaches the following:

This absence of full coverage of the cathode active layer directly over the surface of the microporous separator layer or, alternatively, indirectly over the surface of a protective coating layer which is over the microporous separator layer may be beneficial to allow the coating of edge insulating layers in desired patterns on the separator layer and in contact with a portion of the cathode active layer to reduce the possibility of short-circuiting of the electrodes when fabricated into an electrochemical cell. This is also typically

Thus, the coating of edge insulating layers in the cathode of Song et al. would be beneficial to help prevent short-circuiting of the electrodes. Regarding claims 52-54 and 56, the edge material would function as a light and moisture barrier, and would further prevent contact between the anode and the cathode current collector.

8. Claims 2-4, 10-15, 29-33, and 36-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlson in view of Liu et al (U.S. Patent 6,159,544).

Carlson is applied to claims 1, 5, 7-9, 16-28, 34, 35, and 47-54 for the reasons stated above.

Further, regarding claim 44, Carlson teaches a slitting step in column 26, line 16.

However, Carlson does not teach that the cathode and edge layers are coated substantially simultaneously by a die coater having at least two slots, as recited in claims 4, 10, 13, 29, 36, and 39.

Liu et al. is directed to a die coater having multiple substantially parallel slots for coating adjacent layers of different material on a substrate (see abstract; Fig. 1). Shims are arranged in the slots to form the stripes (see col. 4, lines 40-46).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the die coater of Liu et al. to form the cathode and edge layers of Carlson. In column 2, line 32, Liu et al. teach that the disadvantages of the prior art include "non-uniform width of stripes" and "ambiguous interfaces of coating solutions." Further, in column 2, line 43, the reference teaches that an object of the invention is to provide "distinct interfaces" between stripes. Accordingly, this would provide the artisan sufficient motivation to use the die coater of Liu et al. to form the cathode assembly of Carlson.

Regarding the ranges of separation distance and substrate speed recited in claims 11, 12, 30, and 31, these ranges are not considered to distinguish over the references. A small (e.g., <5 mm) separation between slots would be necessary to obtain the touching stripes disclosed by Liu et al. Additionally, the substrate speed may be adjusted by a skilled artisan depending on the viscosity of the coating mixtures and desired thickness of the coatings.

Regarding claims 41-43, the die of Liu et al. may be considered to be a "dual slot extrusion die," a "slot fed knife die," and a "fluid bearing die." The definition of each type is provided in column 7 of U.S. Patent 6,051,297 (Maier et al). The main differences are in the viscosity of the material being coated and the arrangement of the ancillary rollers, but neither of

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these features affect the basic structure of the die. Thus, the die of Liu could be used to perform any of these coating processes.

Regarding claims 2 and 3, which recite that the coated cathode material comprises a tapered edge, this limitation is also not considered to distinguish over the references. Although the drawings of Carlson schematically show a square-shaped cathode material coating edge, in actual practice this edge would be likely to have a slight taper (i.e., the edge would not be 90 degrees in relation to the substrate). Furthermore, it has generally been held that a change in shape is not sufficient to distinguish over the prior art unless a new or unexpected result is shown. See MPEP §2144.04 (IV).

Response to Arguments

9. Applicant's arguments filed September 4, 2003 have been fully considered but they are not persuasive insofar as they are applicable to the present rejections. With regard to the Yamada reference, Applicants state that "the cathode material is not a cathode material of an electrochemical cell, as required by the present claims." However, as stated above, the claim language merely recites a cathode "for an electrochemical cell." Pursuant to MPEP §2111.02, this is interpreted as the intended use of the cathode and is given little patentable weight. See also *Rowe v. Dror*, 112 F.3d 473, 478, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997) ("where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention, the preamble is not a claim limitation").

Allowable Subject Matter

10. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

Claim 6 recites, among other features, that the edge material and cathode material maintain a separation after being coated onto the substrate. Carlson, the closest prior art, does not teach or fairly suggest this feature. Accordingly, claim 6 contains allowable subject matter.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051 (prior to December 17, 2003) or (571) 272-1299 (after December 17, 2003). The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 872-9310 (for non-final communications) or (703) 872-9311 (for after-final communications).


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Any inquiry of general nature or relating to the status of this application or proceeding
should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

November 11, 2003


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